Osprey Nesting,
Missisquoi National Wildlife Refuge, 2007-2014

Background:

In 1986, with only one known nesting pair of Federally Threatened and State Endangered ospreys in Vermont, the state began its effort to restore the population by establishing artificial nesting platforms, using predator guards to shield nests from mammalian predators, and posting signs around nests to prevent human disturbance. Missisquoi NWR as well as public utility companies, Audubon Vermont, and local Audubon Chapters, contributed to the states' efforts by putting up nesting platforms and helping the Vermont Department of Fish and Wildlife monitor the population. In 1989, Missisquoi NWR had one pair of ospreys using a nesting platform in Long Marsh, and by the mid-1990s, Vermont's osprey population began to substantially increase in size. For the most part, Vermont's ospreys were found in the Missisquoi River Delta, the Lamoille River Delta, and the Dead Creek/Otter Creek wetland complex in Addison County, with some scattered individual nests in the Northeast Kingdom and southwest part of the state.

In 1997, the VFWD wrote the "Vermont Osprey Recovery Plan" to serve as a guide for management activities and to establish recovery goals for the osprey. The osprey was delisted from a Federally Threatened species to a Species of Special Concern in 1999, and in 2005, the osprey was taken off of Vermont's endangered species list. The VFWD "Guidelines for Monitoring and Managing the Osprey Following Removal from the Vermont Endangered and Threatened Species List" called for continued annual monitoring of ospreys for at least 5 years post de-listing. The intent of continued monitoring and management was to: (1) promote the continued secure conservation status of the osprey, (2) document trends in the ospreys' nesting population, and (3) provide early detection of a declining osprey population, in order to re-list the species, if needed. Vermont's post-delisting standard for state-wide osprey monitoring was to determine the number of active nests in late May, and the number of successful nests in late July. Since there were so many nests to be monitored, the VFWD did not require nestling/fledgling counts.

Surveys:

During 2007-2014, staff and volunteers of Missisquoi NWR, in coordination with the VFWD, observed and monitored the annual nesting activity of ospreys throughout the refuge. Ospreys usually arrived in Vermont in April and started nesting activities in early May. Osprey activity was observed by boat, from May to August, to determine: where osprey nests were located on the refuge, the number of active nests in late May, and the number of nests that successfully raised young to near-fledgling stage by late July. Predator guards were placed around all nesting trees, snags, or platforms, early-on in the nesting season, unless the remote location of a nest made it inaccessible, or a tree/snag was too degraded to hold one. In addition, in areas of the refuge that were open to the public, "Area Closed" signs were placed around osprey nests to prevent disturbance by boaters, fishermen, or other refuge visitors.

During late May and early June, all floodplain forest and wetland areas of the refuge were systematically and thoroughly surveyed for osprey nests using a shallow-water Go-Devil boat, a motorized canoe, or a kayak, depending on the habitat conditions and water levels. An osprey nest was considered "active" if adult bird(s) were in it, flying around it, or perched on trees or snags by the nest. Some osprey nests were observed throughout the nesting season, with changes in nest conditions (blow-downs, abandonment, etc.) being noted.

During late July and early August, all osprey nests were re-visited, unless they were inaccessible due to low water levels, impenetrable vegetation, or some other factor beyond our control. Since nestlings fledge in late July or early August, an osprey nest was considered "successful" if near-fledgling or fledgling birds were in it, flying around it, or perched on trees or snags by the nest. Often times, adult birds could be observed at or around the nest site as well.

Number of Active Nests in May:

Although the number of active osprey nests in May fluctuated from year to year, a slight increase in the population of nesting ospreys was observed at Missisquoi NWR during 2007-2014. Overall, an average of 40 (range 33-45) active osprey nests was observed per year (Appendix A). Within this timeframe, the greatest numbers of active nests (45 and 44) were found in 2013 and 2014, respectively, and the lowest numbers (33 and 34) were found in 2009 and 2007, respectively.

Historical data show a steadily increasing number of nesting ospreys at the Missisquoi NWR since 1989. The population of nesting ospreys increased from one pair, on an artificial nesting platform in 1989, to fourteen nests a decade later, in 1999. Twenty nests were found on the refuge in 2002, and by 2004, there were twenty-seven active osprey nests.

Number of Successful Nests in July:

Although the number of successful osprey nests at Missisquoi NWR fluctuated from year to year, at least 78% (range 51%-95%) of all nests were successful during 2007-2014. Within this timeframe, an average of 31 (range 19-42) nests successfully raised young to near-fledgling stage each year, with the highest numbers of successful nests (42 and 36) observed in 2013 and 2014, respectively. Although chicks were not counted, most successful nests at the refuge produced 2 or 3 near-fledgling young.

In some years (2007, 2008, 2010, 2012, and 2014) not all nests could be re-visited in late July or early August due to low water levels in Lake Champlain, robust emergent vegetation, or other factors that made nests inaccessible. During these years, the number of osprey nests reported to be "successful" was likely an underestimate of the actual number of successful nests on the refuge.

Location of Successful Nests:

During 2007-2014, Long Marsh Bay and Channel contained the greatest proportion (29%) of successful osprey nests, followed by Cranberry Pool (19%), Big Marsh Slough (12%), Metcalfe Pothole (11%), and then Cabot/Clark Marsh (8%). During this time, Long Marsh had an average of 9 (range 5-11) successful nests per year, Cranberry Pool had 6 (range 4-7), Big Marsh Slough had 4 (range 1-5), and Metcalfe Pothole (range 1-5) and Cabot/Clark Marsh (range 1-5) both had an average of 3 successful nests per year. Overall, the data show that the forest floodplain habitat surrounding refuge wetlands contained the greatest number of osprey nests, with smaller numbers of nests scattered in habitat along the Missisquoi River, Missisquoi Bay, Dead Creek, and Black and Maquam Creeks.

Failure of Nests:

Osprey nests on Missisquoi NWR failed for a variety of reasons, including the loss or degradation of nesting habitat, inclement weather, predation, and human disturbance. During 2007-2014, many of the failed nests were attributed to blow-downs of either the nests themselves, or the entire nesting tree or snag. During June of 2008, a thunderstorm with high winds was responsible for 5 osprey nest blow-downs in the Shad and Metcalfe Island area of the refuge alone. From one year to another, the change in nesting sites, caused by blow-downs, resulted in ospreys either rebuilding nests or building nests at new locations that needed to be predator-guarded.

Predator- guarding nests was a major factor in nest success. Predator guards were placed around all nesting trees, snags, or platforms, early-on in the nesting season, unless the remote location of a nest made it inaccessible, or a tree/snag was too degraded to hold one. During 2007-2014, all unguarded osprey nests on the refuge failed, indicating that this is still an important and needed management activity for the osprey's success.

Ospreys sometimes built nests on beaver lodges or the root balls of fallen trees, that couldn't be predator-guarded. All of these nests, no matter where they were located (Long Marsh, Dead Creek, Goose Bay Pool) failed. The one exception was the nest built on a beaver lodge at Cranberry Pool that successfully raised near-fledgling young for two years in a row.

Although humans were sometimes observed boating or kayaking in closed areas of the refuge, or fishing near an osprey nest, they did not seem to have a major negative impact on nesting ospreys, unless it was early-on in the nesting season. In 2013, ospreys began building a nest along the Black/Maquam Creek Trail, but later abandoned it, even though it was predator-guarded. In 2014, a first-time nest at the Stephen J. Young Marsh was abandoned after a few weeks. A visitor viewing platform, about 40 yards directly across from the nest, seemed to provide enough disturbances to make the ospreys leave.

Predators, like red foxes that had a den site near an artificial osprey platform at Big Marsh Slough, were observed to have a similar effect, with ospreys abandoning the nest during both years that they were there. In 2014, for the first time, two predator-guarded nests that had been successful in the past were

abandoned. This was thought to be due to increased activity and harassment by nesting and immature bald eagles.

Artificial Nesting Platforms:

Although no artificial osprey nesting platforms have been put up on the refuge for over ten years, six still remain: 2 at Big Marsh Slough and 1 each at Cranberry Pool, Metcalfe Pothole, Cabot/Clark Marsh, and Maquam Bay. During this timeframe, all of the remaining nesting platforms were successfully used by osprey, usually on an annual basis, and were repaired before each nesting season, if needed.

Since the vast majority of nesting ospreys on the refuge now use trees or snags, artificial nesting platforms that become damaged beyond repair were either allowed to fall down by themselves, or were removed by refuge staff, without being replaced. Since 2007, a total of five artificial nesting platforms have come down: one each in Goose Bay Pool and Long Marsh, were removed by refuge staff, and three others (Burton's Pothole, Patrick Marsh, and Long Marsh) fell down by themselves.

Conclusion:

From 2007-2014, Missisquoi NWR has played a major role in the recovery of Vermont's osprey population. During the 2008 nesting season, the refuge contained the greatest proportion of active nests (32%) as well as the greatest proportion (30%) of successful osprey nests in the state, followed by Addison County (27% active; 28% successful), and Sandbar WMA (23% active; 24% successful). In 2009, Missisquoi NWR had 31% of active nests and 36% of the successful osprey nests in the state, again followed by Addison County and Sandbar WMA that had 22% and 21% of the successful nests in the state, respectively. Missisquoi NWR continues to host a large concentration (> 25%) of Vermont's nesting ospreys, but the success of the nests continues to rely on refuge staff predator-guarding them.